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ABSTRACT

This study investigated how obtaining predicted and actual scores on aptitude tests can provide crucial information regarding personal beliefs about ability. The ACID profile of the Wechsler Adult Intelligence Scale (Revised) (WAIS-R) was used to collect the subjective and objective scores of 92 college students with severe scholastic deficits (SSD) and 40 typical college students. The group with SSD reported past severe, continual failure in verbal tasks, but not in performance tasks, whereas the contrast group did not report experiencing severe academic problems. The study hypothesized that in verbal subtests (Arithmetic, Information, and Digit Span), students with SSD would tend to have either veridical estimates or underestimates of ability, whereas the contrast group would tend to overestimate. Second, it was predicted that in the performance subtests (Coding/Digit Symbol), both groups would overestimate. For Arithmetic and Digit Symbol, hypotheses were supported. In Digit Span, the group with SSD underestimated significantly, whereas the contrast group had accurate estimates; this result was in the expected direction. For Information, however, both groups overestimated significantly. Implications of these findings and further research are discussed including using the ACD rather than the ACID profile with adults. (Contains 24 references.) (Author/CR)

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Efficacy and Aptitude

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Running head: Obtaining Efficacy and Aptitude Measures

Obtaining Efficacy and Aptitude Measures from the ACID Profiles of Post-Secondary Students With and Without Severe Scholastic Disabilities

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Abstract

Obtaining predicted and actual scores on aptitude tests provides crucial information regarding personal beliefs about ability. The ACID profile of the WAIS-R was used to collect students' subjective and objective scores. The ACID subtests have been used as profiles of children having severe scholastic deficits (SSD) (Kamphaus, 1993). In this study we examined ACID profiles of post-secondary students with and without SSD (Kaufman, 1990). Hypotheses were derived from Bandura's (1977, 1997) social learning theory of self-efficacy. Bandura (1986, 1989) argued that repeated failure may lead to self-limiting veridical beliefs. The group with SSD reported past severe, continual failure in Verbal tasks, but not in Performance tasks, whereas the contrast group did not report experiencing severe academic problems. We hypothesized that in the Verbal subtests (Arithmetic, Information, and Digit Span), students with SSD would tend to have either veridical estimates or underestimates of ability, whereas the contrast group would tend to overestimate. Second, we predicted that in the Performance subtest (Coding/Digit Symbol), both groups would overestimate. For Arithmetic and Digit Symbol, hypotheses were supported. In Digit Span, the group with SSD underestimated significantly whereas the contrast group had accurate estimates; this result was in the expected direction. For Information, however, both groups overestimated significantly. Implications of these findings and further research will be discussed including using the ACD rather than the ACID profile with adults.

Obtaining Efficacy and Aptitude Measures from the ACID Profiles
of Post-Secondary Students With and Without Severe Scholastic Disabilities

In this study, efficacy expectations on the ACID profile of students with and without severe scholastic deficits (SSD) were compared. Bandura's (1977) self-efficacy theory was investigated by studying the relation between predicted and actual ACID scores. Kamphaus (1993) argues that the ACID profile alone cannot explain learning problems because its validity and reliability are too low. However, he states that profiles have practical utility for theory building and research purposes, an opinion also held by Kaufman (1990). In adults, Information does not appear to be an essential component, and the ACD profile may be equally useful (Kaufman, 1990). Therefore, we investigated both the ACID and ACD profiles in a college adult sample.

Bandura (1989) argues that severe repeated failures in specific subject areas may lead to self-limiting beliefs about the likelihood of personal success in the areas. Veridical estimates or underestimates of personal ability may seriously hinder motivation and achievement. People who are normally-achieving tend to exhibit more positive expectations (Bandura, 1986; Taylor & Brown, 1988). We therefore examined efficacy beliefs of students with SSD having histories of failure in reading but not in performance and compared them with students without SSD. Based on Kaufman's (1990) work on intelligence and Bandura's (1997) research on self-efficacy, we asked three questions:

1. Is the more parsimonious ACD profile as effective as ACID for college adults with SSD?

2. In the Verbal subtests (AID) does the group with SSD tend to have veridical estimates or underestimates, while the contrast group tends to overestimate?
3. In the Performance subtest (C) do both groups tend to overestimate?

Method

Participants

All of the post-secondary students employed in this study were taken from colleges in Southwestern Ontario. The contrast group consisted of 40 people ($n = 20$ men and $n = 20$ women) and the group with SSD contained 92 people ($n = 51$ men and $n = 41$ women). The mean age of the contrast group and group with SSD was 26 and 27 years respectively. The contrast group included post-secondary students who volunteered for the study. During the screening process, it was determined that they had no severe, long-term academic difficulties; nor were they currently experiencing difficulties in their college courses.

The students with SSD sought assistance from the Adult Study Skills Clinic due to problems in one or more areas (e.g., reading comprehension, writing, arithmetic). These deficits were so debilitating that their current college performance was being affected negatively. These students reported having experienced persistent severe academic difficulty dating back to public school. In the psychoeducational assessment later administered, these perceptions were supported; they scored below the 40th percentile on four or more of the 21 subtests employed. Their scores were below the 40th percentile on an average of seven subtests. For the rigorous demands of university, such

scores in adults tend to signal the need for support and special accommodations

All students had: (a) English as their first language, (b) IQs of 85 or above, and (c) no primary emotional problems. Therefore, confounding effects due to cultural differences, severe developmental problems, and psychological difficulties were screened out for both the contrast group and the group with SSD.

Measures

Students with SSD reported the reasons they sought assistance from the Adult Study Skills Clinic. Writing essays, writing essay examinations, and reading were reported by the majority of the sample as problems persisting from youth to adulthood. Students without SSD completed a similar survey; no deficits were reported.

Self-Estimate Test. The Self-Estimate Test of Intellectual Functioning (Shafrir, 1994) was administered to measure students' judgments of how well they would perform on the WAIS-R subtests. Each subtest was described concisely and then illustrated by an easy and a difficult example. Students predicted their efficiency of response on a relative scale from 1 to 19 (1 = much worse than people my age, 10 = as well as people my age, 19 = much better than people my age). The Wechsler Adult Intelligence Scale-Revised (WAIS-R) was then administered to students and actual subtest scores were obtained. Predicted and actual scores were transformed to standard scores with a mean of 100 and a standard deviation of 15. Expected and actual achievement scores were then compared.

Procedure

Students were assessed individually. They answered questions about their

learning history, predicted their ability on the WAIS-R subtests, and then completed the actual WAIS-R test. (Students with SSD were administered the remaining test battery after completing this phase.) Criterion measures were the standardized predicted scores on the Self-Estimate subtests and the standardized actual scores on the WAIS-R subtests. It should be noted that students with SSD were identified by their histories and by an eight-hour test battery and not by deviation on the ACID profile.

Results

A repeated measures ANOVA was used to analyze the data. A 2 x 2 x 4 (Group by Scores by Subtests) design was used. There was a significant three-way interaction ($F(3,390) = 3.72, p < .01; MSE = 130.59$), and so actual and predicted group scores were compared (see Table 1 and Figure 1). Significant interactions were tested using the Bonferroni t test to control for error related to multiple testing. Figure 1 shows that, in the Verbal subtests, the hypothesis was partially supported. In Arithmetic the contrast group overestimated significantly while the group with SSD had a veridical estimate. In Digit Span, the contrast group had veridical estimates, whereas the group with SSD underestimated significantly. Although the group without SSD did not overestimate, the difference between the two groups was in the expected direction with the contrast group tending to have relatively higher estimates of ability than the group with SSD. However, in Information, the hypothesis was contrary to what was predicted. Both groups tended to overestimate significantly.

In the Performance subtest of Digit Symbol, both groups overestimated

significantly, supporting our second hypothesis. For this college sample, the Arithmetic, Digit Span, and Digit Symbol trio tended for the adults to be a better descriptor than the ACID profile (Kaufman, 1990).

In order to test this hypothesis further, a stepwise multiple regression using the actual scores on the WAIS-R subtests as variables was performed. The three subtests of Digit Span, Digit Symbol, and Arithmetic emerged as the first three variables that distinguished between groups (see Figure 2). This result supported the observation made by Kaufman (1990) who argued that for adults Information did not appear to indicate a learning deficit. These ACD subtests were the members of the Bannantyne's Sequential factor.

Discussion

This study yielded useful information about adult students with and without SSD. First, we found, as Kaufman (1990) stated, that the ACD profile is more parsimonious and as useful as the ACID profile. Second, we found mixed evidence that partially supports our hypotheses regarding efficacy levels and estimation of students with and without severe repeated histories of failure.

ACID Profile. Information did not appear to be an important subtest for college adults. The mean score for the contrast group was 104.75 and for the group with SSD it was 102.83, an insignificant difference. Kaufman (1990) argues that college students with learning problems tend to have a more extensive knowledge base relative to the larger population with learning problems. Their range of experiences also increases due to

maturation, and so their Information scores are not significantly different from those of contrast groups, unlike studies employing children. In our sample, Digit Span, Digit Symbol, and Arithmetic best distinguished between groups. It would be informative to extend this study to a sample of non-college adults to determine the consistency of these patterns.

Efficacy Expectations. In Digit Symbol, as predicted, both groups overestimated significantly. The fact that students with SSD did not report failure in performance tasks probably explains their tendency to overestimate. Students were not told that speed was an essential part of the test. Perhaps emphasizing the speed requirement would influence students' predictions of ability.

In Arithmetic, our hypothesis was supported. However, in Digit Span, the contrast group had veridical estimates while the group with SSD significantly underestimated. Perhaps the emphasis on precision in the Digit Span task (the numbers must be in exactly the correct sequence) decreased predictions for the contrast group. The findings were in the expected direction, however, with the group with SSD having lower ratings than the contrast group.

Finally, both groups overestimated significantly in Information. The reasons for overestimation may be those stated earlier. Perhaps the easy and difficult example items were too easy; the easy example was "Where does the sun set?" and the more difficult question was "Who were the Wright brothers?" A careful re-examination of these examples might be performed as a result of these findings.

Discrepancy models, the ACID profile, and special needs. This study did not use the ACID profile as part of a discrepancy formula, although such formulae are commonly used to identify young children with learning disabilities (Kamphaus, 1993; Sprandel, 1995). In discrepancy formulae, the ACID subtest scores are compared with other WAIS scores, and if the ACID scores are significantly lower than the others, this pattern is considered an indicator of learning disability (Flanagan, Andrews, & Genshaft, 1997; Kaufman, 1990; Mishra, Ferguson, & King, 1985). The discrepancy model is also used with other aptitude and performance tests to distinguish dyslexic from poor readers. In such approaches, if aptitude scores are markedly superior to reading achievement scores, students are termed dyslexic.

There are conceptual problems with such discrepancy models which have been noted by a number of writers (e.g., Aaron, 1997; Siegel, 1989). A major criticism is that the WAIS-R was developed in order to measure general intelligence rather than learning disability (Aaron, 1997; Flanagan et al., 1997; Siegel, 1989; 1992; Stanovich, 1991). The ACID tests were included in the WAIS because they measure general intelligence, and they relate to the other parts of the test. Treating these four parts as being independent of other parts of the test is inconsistent with construct validity (Kamphaus, 1993; Stanovich, 1991).

Rather than trying to establish some diagnosis such as learning disability, a more practical plan is to identify where the person is experiencing difficulty so that remediation can be directed toward alleviating the problem. Stanovich, (1991) and Swanson (1991)

argue that in the area of learning disability testing serves little purpose unless it leads to differential instruction (i.e., instructional approaches that differ from the normal curriculum). Similarly, Siegel (1989; 1992) proposes that people should be assessed in the area of their difficulty. Finally, Aaron (1997) proposes a Comprehensive Model of diagnosis consisting of a variety of achievement tests focusing specifically on the disability. In the present study using post-secondary students, a variety of formal and informal tests were used: mathematics, visual-spatial, single word decoding, silent and oral reading comprehension, writing, affective measures, and post-session interviews. This approach provided a broad pool of data from which to plan a remedial program. The ACID profile was not used to decide upon a diagnostic category, but rather to provide information about sequencing skill.

Overestimation - The serpent in the garden or the apple? This study suggests that people who have not experienced repeated failure in particular cognitive areas are more apt to overestimate their performance than people who have experienced repeated failure. This finding is consistent with observations by Bandura (1977, 1986, 1997) which he incorporated into his theory of social learning. He states that overestimation (i.e., predictions of performance that exceed actual performance) is a desirable condition except when it is detrimental to the self or others (Bandura, 1989; Wood & Bandura, 1991). On the other hand, he contends that veridical estimation is self-limiting because such a mind set inhibits confident and vigorous striving in situations where successful outcomes are uncertain (Bandura, 1986, 1989, 1997). People who have a robust sense of

capability and stretch their limits are said to have strong self-efficacy. This view that overestimation is positive and adaptive is contrary to a very common belief in the mental health field that people should develop realistic perceptions of their actual capabilities. Contrary to this traditional belief, Bandura (1997), Beck, Rush, Shaw, and Emery (1979), Seligman (1991, 1994), and Taylor and Brown (1988) have noted that people who have the most realistic self-perceptions are the clinically depressed.

The construct of self-efficacy which was central to this study is frequently confused with self-regulation. Self-efficacy is defined as the conviction that one can execute the task successfully to produce the desired outcome (Bandura, 1977). Self-regulation, on the other hand, is defined as “the process whereby students activate and sustain cognitions, behaviors, and affects, which are systematically oriented toward attainment of their goals” (Schunk & Zimmerman, 1994, p. 309). The measure used in this study is much more closely related to self-efficacy than to self-regulation. Although the person is given a description of each subtest and an easy and difficult example, concrete and comprehensive knowledge of the items is not available when making the estimation. Therefore, the relation between the predicted and the actual standard scores will probably be influenced to a considerable extent by the person’s efficacy expectations as developed from past experience with similar situations. Self-regulation, however, refers more to the precision of one’s ongoing cognitive, behavioral , and affective responses during the course of adaptation. In this latter situation, reasonable accuracy in interpreting feedback is necessary. Self-efficacy, therefore, appears more related to the

conviction that one can perform a specific task successfully, whereas self-regulation appears to be more related to the ongoing process and accurate monitoring of performance during adaptation.

There are situations in life where veridical beliefs are detrimental and optimistic overestimation is desirable. Students with special needs have often been found to profit from post secondary education if certain instructional modifications are made for them even though many believe that such positive learning outcomes are highly unlikely. Even professors need a strong sense of self-efficacy when it comes to publication. The likelihood of having articles rejected is actually very high in professional journals. Some people whose work is initially rejected quickly overcome their initial disappointment, persevere, and eventually become successful. Without their sturdy, resolute sense of self-efficacy we would not benefit from their insights and from the outcomes of their scholarly activity.

Future avenues of study. Several additional measures might have been informative with this group of students. First, it might be useful to develop a qualitative interview that would identify student supports. College students with reassuring families and friends may be able to achieve more than those lacking such environmental supports (Corey & Corey, 1987). Related future avenues for research might also be to ask students what reference group they used to predict relative ability. Such information might provide us with more information about their perceptions (e.g., students may have higher relative predictions when comparing themselves with a non-college group of age-mates

and have lower predictions when comparing themselves to a college group).

What is 'reasonable' overestimation? Bandura (1997) argues that if overestimation does not have disastrous consequences for oneself or for others, high beliefs about one's ability are desirable. Zimmerman, Bonner, and Kovach (1996) state that for students, overestimates of ability may result in poor self-monitoring, lack of preparation, and failure. Obviously, we do not want students to be careless or thoughtless during learning. However, we do want them to believe that they can do tasks without becoming so anxious and fearful that they avoid the tasks altogether, thereby failing, or worse yet, quitting. It would appear from Bandura's (1986), Pajares and Miller's (1994), and Taylor and Brown's (1988) work that a tendency to overestimate rather than having an accurate world view is more desirable for college students. An optimistic approach to work may inspire students having SSD with the belief that with practice and assistance they will manage and ultimately master the skills necessary to realize their goals.

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Table 1

Means, Standard Deviations, and t Tests Comparing Predicted and Actual Scores on the ACID Profile for Contrast Group and Group With Severe Scholastic Deficits.

	Contrast (<u>n</u> = 40)			SSD (<u>n</u> = 92)		
	Predicted	Actual	<u>t</u>	Predicted	Actual	<u>t</u>
Arithmetic	117.63	106.75	4.28**	99.24	100.22	0.58
<u>SD</u>	(20.41)	(10.53)		(19.07)	(11.97)	
Coding (Digit Symbol)	120.63	107.75	5.04**	114.08	99.08	8.90**
<u>SD</u>	(16.34)	(11.03)		(17.79)	(12.51)	
Information	117.25	104.75	4.89**	112.66	102.83	5.83**
<u>SD</u>	(14.98)	(10.80)		(18.61)	(12.10)	
Digit Span	111.75	111.25	0.20	94.40	100.22	-3.45**
<u>SD</u>	(14.44)	(11.81)		(18.42)	(11.83)	

Note. SSD= Severe Scholastic Deficits, **SD** = Standard Deviation, Standard Deviations are in parentheses, **MSE** = 130.59.

* **p** < .05, ****p** < .01.

Figure Caption

Figure 1. Significant three-way interaction of predicted and actual ACID subtest scores of college students with and without Severe Scholastic Deficits (SSD).

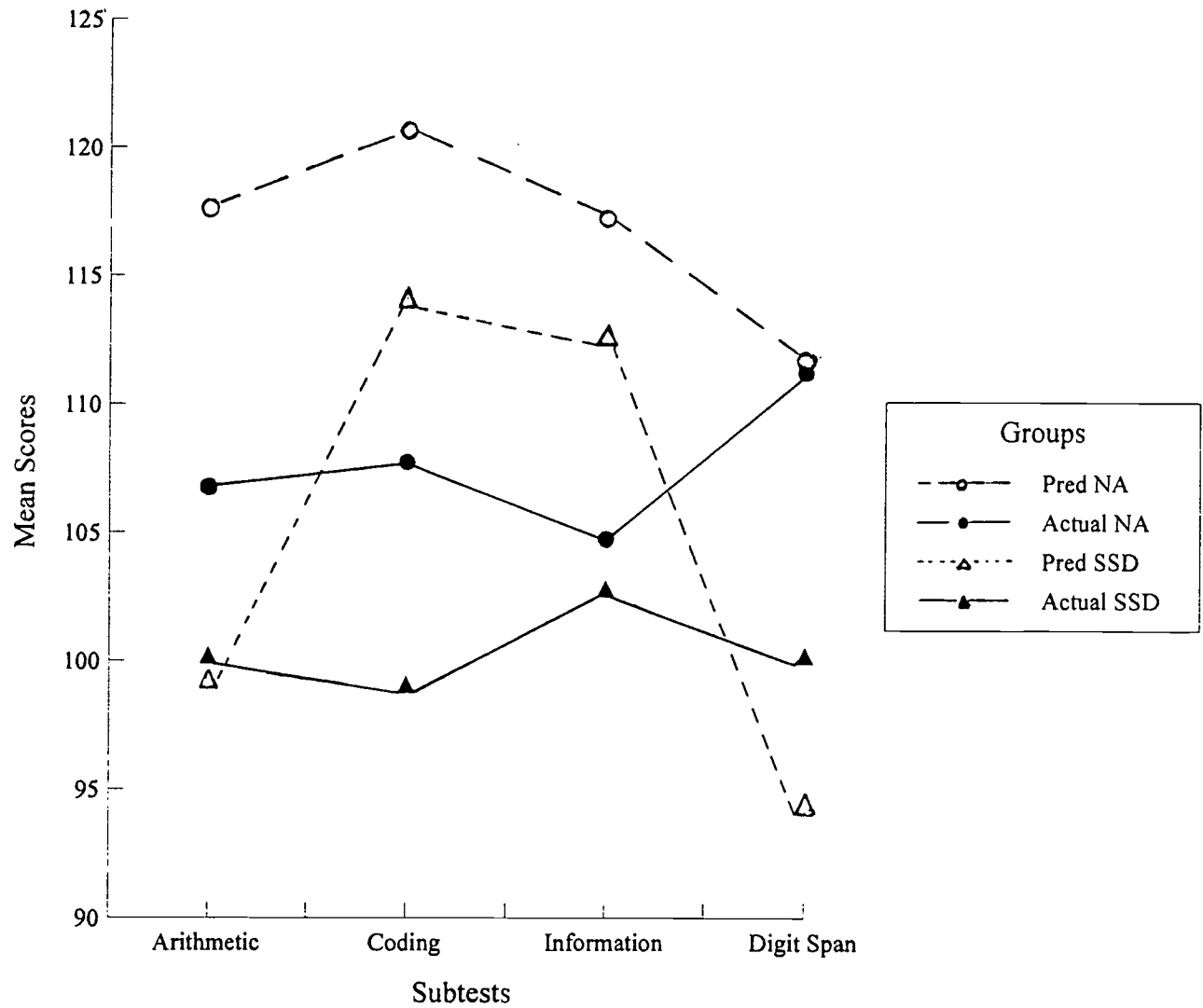


Figure Caption

Figure 2. Stepwise regression for groups with and without severe scholastic deficit using nine predictor variables.

STEP	1	2	3	4	5	6	7	8	9
CONSTANT	-0.1732	-1.0926	-1.3725	-1.0644	-0.8442	-1.0240	-1.0158	-0.9602	-0.9889
Digit Span T-RATIO	0.0143 4.93	0.0132 4.75	0.0121 4.18	0.0113 3.88	0.0111 3.75	0.0105 3.49	0.0104 3.44	0.0105 3.44	0.0105 3.42
Digit Symbol T-RATIO		0.0101 3.58	0.0096 3.38	0.0110 3.67	0.0113 3.74	0.0120 3.86	0.0120 3.85	0.0118 3.70	0.0119 3.69
Arithmetic T-RATIO			0.0044 1.41	0.0047 1.50	0.0047 1.51	0.0040 1.25	0.0043 1.24	0.0046 1.25	0.0044 1.20
Object Assembly T-RATIO				-0.0039 -1.42	-0.0033 -1.16	-0.0039 -1.33	-0.0034 -0.91	-0.0034 -0.92	-0.0034 -0.91
Picture Completion T-RATIO					-0.0028 -0.86	-0.0034 -1.02	-0.0034 -1.01	-0.0033 -0.98	-0.0033 -0.96
Similarities T-RATIO						0.0033 0.96	0.0034 0.96	-0.0038 0.93	-0.0039 0.93
Block Design T-RATIO							-0.0008 -0.23	-0.0010 -0.26	-0.0015 -0.28
Vocabulary T-RATIO								-0.0010 -0.23	-0.0015 -0.31
Information T-RATIO									0.0009 0.23
S	0.425	0.407	0.405	0.404	0.404	0.404	0.406	0.408	0.409
R-SQ	15.73	23.34	24.51	25.70	26.13	26.67	26.71	26.74	26.77

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